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Some Observations about Shining Flesh, made by the Honourable Robert Boyle; ^{March.} Febr. 15. 16⁷¹. and by way of Letter addressed to the Publisher, and presented to the R. Society.

Y Esternight when I was about to go to bed, an *Ama-
nuefs* of mine, accusom'd to make Observations, informed me, that one of the Servants of the house, going upon some occasion into the Larder, was frighted by something of Luminous that she saw (notwithstanding the darkness of the place,) where the meat had been hung up before: Whereupon suspending for a while my going to rest, I presently sent for the meat into my Chamber, and caused it to be placed in a corner of the room capable of being made considerably dark, and then I plainly saw, both with wonder and delight, that the joint of meat did in divers places shine like rotten Wood or stinking Fish; which was so uncommon a sight, that I had presently thoughts of inviting you to be a sharer in the pleasure of it. But the late hour of the night did not only make me fear to give you too unseasonable a trouble, but being joyned with a great Cold I had got that day by making Tryal of a new Telescope (you saw,) in a windy place, I durst not sit up long enough to make all the tryals that I thought of and judg'd the occasion worthy of. But yet, because I effectually resolved to imploy the little time I had to spare, in making such Observations and tryals, as the accommodations, I could procure at so inconvenient an hour, would enable me, I shall here give you a brief account of the chief circumstances and *Phænomena*, that I had opportunity to take notice of.

1. Then I must tell you, that the subject, we discourse of, was a Neck of Veal, which, as I learned by inquiry, had been bought of a Country-butcher on the Tuesday preceding.

2. In

2. In this one piece of meat I reckoned distinctly above *twenty* several places that did all of them shine, though not all of them alike, some of them doing it but very faintly.

3. The bigness of these Lucid parts was differing enough, some of them being as big as the nail of a mans middle finger, some few bigger, and most of them less. Nor were there figures at all more uniform, some being inclined to a round, others almost oval, but the greatest part of them very irregularly shap'd.

4. The parts that shone most, which 'twas not so easie to determine in the dark, were some gristly or soft parts of the bones, where the Butcher's Cleaver had passed; but these were not the only parts that were luminous; for by drawing to and fro the *Medulla spinalis*, we found, that a part of that also did not shine ill: And I perceived one place in a *Tendon* to afford some light; and lastly three or four spots in the fleshy parts at a good distance from the bones were plainly discovered by their own light, though that were fainter than in the parts above mentioned.

5. When all these Lucid parts were survey'd together, they made a very splendid shew; but 'twas not so easie, because of the moistness and grossness of the lump of matter, to examine the degree of their Luminousness, as it is to estimate that of Glowworms, which being small and dry bodies may be conveniently laid in a book, and made to move from one letter or word to another. But by good fortune having by me the curious *Transactions* of this month, I was able so to apply that flexible paper to some of the more resplendent spots, that I could plainly read divers consecutive letters of the Title.

6. The Colour that accompanied the light was not in all the same, but in those which shone liveliest, it seemed to have such a fine Greenish blew, as I have divers times observed in the tails of Glowworms.

7. But notwithstanding the vividness of this Light, I could not by the touch discern the least degree of Heat in the parts whence it proceeded; and having put some marks on one or two of the more shining places, that I might know them again when brought to the light, I applied a seal'd Weather glass, furnished with tincted spirit of wine, for a pretty while, and could not satisfy myself, that the shining parts did at all sensibly warm the liquor: But the Thermoscope, though good in its kind, being not fitted for such nice Experiments, I did not build much upon that tryal.

8. Notwithstanding the great number of lucid parts in this Neck of Veal, yet neither I, nor any of those that were about me, could perceive by the smell the least degree of stink, whence to infer any Putrefaction; the meat being judged very fresh and well condition'd and fit to be dressed.

9. The floor of the Larder, where this meat was kept, is almost a story lower then the level of the street, and 'tis divided from the Kitchen but by a partition of boards, and is furnished but with one window, which is not great, and looks toward the street, which lyes North ward from it.

10. The wind, as far as we could observe it, was then at Southwest, and blustering enough. The Air by the seal'd Thermoscope appeared hot for the season. The Moon was past its last Quarter. The Mercury in the Barometer stood at $29\frac{3}{8}$ inches.

11. We cut off with a knife one of the luminous parts, which proved to be a tender bone, and being of about the thickness of a half Crown piece, appeared to shine on both sides though not equally; and that part of the bone, whence this had been cut off, continued joined to the rest of the Neck of Veal, and was seen to shine, but nothing near so vividly as the part, we had taken off, did before.

12. To

12. To try, whether I could obtain any juice or moist substance from this, as I have several times done from the tails of Glowworms; I rub'd some of the softer and more lucid parts, (which I caused to be purposely cut off,) as dextrously as I could, upon my hand, but I did not at all perceive any luminous moisture was thereby imparted; though the flesh seemed by that operation to have lost some of its light.

13. I caused also a piece of shining flesh to be compressed betwixt two pieces of glass, to try, how well the contexture of it would resist that external force; but I did not find the light to be thereby extinguished during the short time I could allot to the Experiment.

14. But supposing, that high rectified Spirit of wine might so alter the contexture of the body it permeated, as to destroy its faculty of Shining, I put a luminous piece of Veal into a Crystalline phial, and pouring on it a little pure Spirit of wine that would have burned all away, after I had shaken them together, I laid by the glass, and in about a quarter of an hour or less I found that the light was vanished.

15. But water would not so easily quench our seeming fires; for having put one of them into a China Cup, and almost filled it with cold water, the light did not only appear, perhaps undiminished, through that Liquor, but above an hour after was vigorous enough not to be eclipsed by being looked upon at no great distance from a burning Candle, that was none of the smallest; and probably the light would have been seen much longer, if we could have afforded to watch out its duration.

16. Whilst these things were doing, I caused the Pneumatical Engine to be prepared in a room without fire, (that the Experiment might be tryed in a greater degree of darkness; and having conveyed one of the largest luminous pieces into a small Receiver, we caused the candles to be put out, and the pump to be plied in the dark; but the

the diminution of light, after the pump seemed to have been employed for a competent while, appeared so inconsiderable, (whether because our eyes had leisure to be fitted to that dark place, or for what other cause soever,) that I began to suspect, that the instrument, having been managed in the dark, had leaked all the while. Wherefore causing the lights to be brought in, and a *Mercurial Gage* to be put into the Receiver; when we were sure that this glass was well cemented on to the Engine, the Candles being removed, the pump was set a work again; and then opening my eyes, which I had kept clos'd against the light of the Candles, I could perceive, upon the gradual withdrawing of the Air, a discernible and gradual lessening of the light; which yet was never brought quite to disappear (as I long since told you the light of Rotten Wood and Glowworms had done,) or to be so near vanishing as one would have expected; though upon the bringing in of the Candles again it appeared by the *Gage*, that the Pump had been diligently applied. But the room being once again darkened; by the hasty increase of light, that had disclosed it self in the Veal upon this letting in of the Air to the Exhausted Receiver, it appeared more manifestly than before, that the decrement, though but slowly made, had been considerable. This tryal we once more repeated with a not unlike success; which though it convinced us, that the Luminous matter of our included body was more vigorous or tenacious than that of most other shining bodies; yet it left us some doubts, that the light would have been much more impaired, if not quite made to vanish, if the subject of it could have been kept long enough in our Exhausted Receiver: But the unseasonable time of the night reducing me at length to go to bed, I could not stay to prosecute this or any other tryal.

17. Only, whilst I was undressing, this further Observation occur'd, that supposing there might be in the same Larder more joints of the same Veal than one, innobled with

with this shining faculty, it was found, that a Legg of Veal, which was caused to be brought into my Chamber, had some shining places in it; though they were but very few and faint in comparison of those, that were conspicuous in the above-mentioned Neck.

18. What further *Phænomena* this morning might have afforded me, I cannot tell, having been hastily called up before day for a Niece, that I am very justly and exceedingly concerned for, who was thought to be upon the point of death, and whose almost gasping condition had too much affected and imployed me, to leave me any time for Philosophical entertainments, that require a calm, if not a pleased, mind. Only this I took notice of, because the observation could not cost me a minute of an hour, that whilst they were bringing me Candles for to rise by, I looked upon a clean phial, that I had laid upon the bed by me after a piece of our luminous Veal had been included in it, and found it to shine vividly at that time, which was between four and five of clock this morning, since when I have made no one observation or tryal.

POSTSCRIPT.

19. Near two days after I had made the forementioned Observations, those horrid symptoms of my Niece's disease, that had so much alarmed the Physicians and me, being through Gods goodness considerably abated, I began to resume the thoughts of our Shining Veal, and though, having in the hurry I was in forgotten to take any order about it, I found it was already disposed of; yet the piece, I lately mentioned to have been included in a phial, being preserved in it, I looked upon it the third day (inclusively) after we had first observed the meat, 'twas cut off from, to be luminous; and I found it to shine in the dark as vigorously as ever. The fourth day its light was also conspicuous, so that I was able in a dark Corner of the room to shew it.

it even in the day time to three or four very ingenious Physitians, all of them (save one) members of the *R. Society*; and I presume I need not re-mind you, that the following night I invited you to be a *spectator* of it, though before that time the light had begun to decay and the offensive smell to grow somewhat strong: which seems to argue, that the disposition, upon whole account our Veal was luminous, may very well consist both with its being and not being in a state of *putrefaction*, and consequently is not likely to be derived merely from the one or the other. The fifth day, in the morning looking upon it when I awaked, and before the curtains were opened, it seemed to shine better than it had done the day preceding. The same night also it was manifest enough, though not vivid, in the dark. When I awaked, the sixth day in the morning after the Sun was risen, I could within the Curtain perceive a glimmering light. But the seventh day, which was yesterday, I could not late at night discern any light at all.

You saw too much in what a condition I was, when you did me the favour to visit me, to expect that I should presume to entertain you with any Speculations about the cause of these unusual apparitions of light. 'Tis true indeed, that in some notes, I formerly mentioned to you, I endeavoured to make it probable, that whether Light depend upon a particular kind of Impulse propagated through a transparent *Medium*; or upon a Diffusion of extremely little parts from the Luminous body; or upon the Action of some other corporeal agent; what ever the Efficient be, the Effect is produced in a *Mechanical* way. But though I had these papers by me; yet to determine what peculiar Kind of motions or other operations Nature really employed in the production of a light, which seemed not clearly (by what I shall presently note) referable either to the particular and settled constitution of the *Animals*, whose flesh shined; (as in our Glowworms and some *American* flies;)

or

or to that intestine and unusual motion of the parts, that causes or accompanies Putrefaction in Rotten Wood or Fishes; since upon the first and liveliest appearance of the Light, there was not any (at least that could be taken notice of by the senses:) To determine this, I say, it seem'd to me so difficult a task, that I shall willingly leave the Solution of such abstruse *Phænomena* as some of ours, unattempted; especially since I may, God permitting, make an Historical mention of them the day after to morrow at the Meeting of the *Royal Society*; where I doubt not much more and more to the purpose will be said and consider'd, than I have vanity to think my self capable of offering. Only, for the prevention of some needless conjectures, to which without this previous Advertisement one might upon plausible grounds indulge, I shall in the mean while add and conclude with one Observation more, which may possibly take off our thoughts from striving to deduce the Shining of our Veal from the peculiar nourishment, or constitution, or properties of that individual Calf, whose flesh, &c. was luminous. For, having several nights sent purposely into the Larder, to observe, whether any Veal, since brought thither, or any other meat, did afford any light, a negative answer was alwaies brought me back; save at one time, which happened to be within less than 48 hours of that, at which the Luminousness of the Veal had been first taken notice of; for at this time there was in the same Larder a conspicuous light seen in a *Pullet*, that hung up there, which having caus'd to be brought up into a darkned place in my chamber in the night time, I perceived four or five luminous places, which were not indeed near so large as those of the Veal, but were little less vivid than they. All of these I took notice to be either upon or near the Rump, and that, which appear'd most like a Spark of Fire, shone at the very tip of that part. Yet was not this Foul mortified, nor at all ill-sented, but so fresh, that the next day I found it very good meat. But whether this may reasonably lead to

a suspicion, that the peculiar constitution of the *Air* in that Larder, and at that time, may as well deserve to be taken into consideration, as the peculiar nature of the *Animals* whose flesh did shine, is a question, that I, who have scarce time to name it, must not presume to do any more than name. And therefore as soon as I have begg'd your pardon for this tedious though hasty scribe, I shall without Ceremony subscribe my self, &c.

A Description of an odd kind of Mushrom, yeilding a Milky Juice, much hotter upon the tongue than Pepper, &c. Observed by Mr. Lister, and by him communicated to the Publisher, Novemb. 15. 1672.

THe 18. of *August* last I passed through *Marton* woods, under *Pinno-moor* in *Craven*: In these Woods I then found an infinite number of *Mushroms*, some wither'd, and others new-sprung and flourishing. They were of a large size, something bigger than the *Ordinary red-gilled eatable Mushrom* or *Champignon*, and very much of their shape, that is, with a perfectly round Cap, or Stool (as we vulgarly call it,) thick in flesh and with open Gills underneath; having a thick, fleshy, not-hollow, and round Foot-stalk, of about 6 fingers breadth high above ground, and ordinarily as thick as my thumb. If you cut any part of this Mushrom, it will bleed exceeding freely a Milk-white Juice, concerning which note: 1. That this Milky Juice tastes much hotter upon the tongue than Pepper. 2. That it is not clammy to the touch. 3. That the Air does not much discolour it, or the blade of a knife; as is usual with most Vegetable Juices. 4. That it became in the glass-viol, I drew it into, suddenly concret and stiff, and did in some daies dry into a firm Cake. 5. That it then also, when well dried, retain'd its fierce biting tast and white colour.

Further, I observ'd these Mushrooms, full of Juice, not to be endured upon our tongues, to abound with Fly-maggots.

A. M.